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"WHOLE BOWEL IRRIGATION IN TOXICOLOGY: A FOCUSED REVIEW ON CURRENT EVIDENCE, CLINICAL INDICATIONS, AND PRACTICAL APPLICATIONS"

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ABSTRACT:

Whole bowel irrigation (WBI) is a decontamination technique of the gastrointestinal tract that involves enteral administration of large volumes of polyethylene glycol electrolyte solution (PEG-ELS) to remove ingested toxins. In the past, WBI served as an alternative to invasive methods like gastric lavage and syrup of ipecac. But in recent times, with the evolution in toxicology, the routine use of WBI has declined significantly. There is limited solid evidence that shows improvement in clinical outcomes. The American Academy of Clinical Toxicology and the European Association of Poisons Centres recommend inhibiting routine application while excluding the use in scenarios such as sustained-release or enteric-coated drug overdoses, heavy metal poisoning, and ingestion of drug packets. This review critically evaluates current evidence on WBI while discussing its pharmacological rationale, examines contemporary indications and limitations, and provides a controversy analysis.

KEY WORDS:- Toxicology, Whole Bowel Irrigation, Poison Control, Drugs, Gastric Lavage

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INTRODUCTION

Gastrointestinal decontamination has developed a lot in recent times. Earlier, many aggressive interventions like gastric lavage, cathartics, syrup of ipecac, activated charcoal, and whole bowel irrigation [1]. With the advancement in evidence-based medicine, these methods were re-evaluated, especially regarding their effects on mortality and clinical outcomes.

Whole bowel irrigation is a method where clear toxins are removed mechanically from the gastrointestinal tract through administration of an osmotically balanced polyethylene glycol electrolyte (PEG-ELS) lavage solution. PEG-ELS causes minimal net absorption or secretion of electrolytes compared to cathartics, which allows rapid intestinal transit with relative physiological stability [2].

Even though WBI has theoretical advantages, it remains controversial. Despite volunteer and observational studies showing a reduction in toxin absorption, reliable controlled clinical trials resulting in improved patient-centred outcomes remain lacking. [2,5]

METHODS

This review is formed using toxicology position statements, poison-centre guidance documents, and peer-reviewed publications on whole bowel irrigation. We focused mainly on the consensus recommendations from the American Academy of Clinical Toxicology (AACT) and European Association of Poisons Centres and Clinical Toxicologists (EAPCCT), the updated 2015 position paper, and current poison-centre protocols. These sources helped us summarise the indications, contraindications, practical techniques, and evidence gaps associated with WBI.

Mechanism and Procedure of Whole Bowel Irrigation

WBI involves enteral administration of large volumes of PEG-ELS either orally or via nasogastric tube until rectal effluent becomes clear. Recommended infusion rates include:

- Adults: 1.5-2 L/hour
- Children: (6-12 years): 1 L/hour
- Younger children: 500 ml/hour [1]

The principal mechanism of WBI is rapid mechanical evacuation of gastrointestinal contents before complete toxin absorption occurs. WBI is mostly useful in poorly absorbed toxins by

activated charcoal, formulated as sustained-release preparations, or present with ingested packets [6].

Evolution of Gastrointestinal Decontamination

The decline of routine gastrointestinal decontamination shows how modern clinical toxicology has evolved. Older methods were mainly based on physiological reasoning rather than solid clinical proof. Later studies showed that many interventions didn't significantly improve outcomes and had considerable procedural risks [1].

Syrup of ipecac and gastric lavage aren't used as much anymore. While activated charcoal is still helpful in specific cases, its use is more selective now. WBI stands out since it's still applied in certain niche scenarios, despite having limited high-level evidence [1].

Technique

WBI is usually done using PEG-ELS, which is given either orally or through a nasogastric tube. Before beginning, the clinicians should confirm that it is necessary and consider checking with poison control [1,5]. Patient should be seated, or with the upper part of the bed raised to avoid breathing in the liquid. A prokinetic emetic like metoclopramide can be given if nausea or slowed transit is limiting the tolerance. The decision should be situation dependent [5]. In cases of illicit drug packing or radiopaque tablets, a clinician might need to do extra scans to make sure everything is cleared out once the procedure is over [1].

The sequence for the procedure is as follows: firstly, do the airway assessment and see if the vital signs are stable. Then set up the nasogastric tube if needed. After that, begin pumping in the PEG-ELS at the suggested rate, watch out for vomiting, abdominal distention, or intolerance, and continue until clear effluent is achieved or when you hit the maximum planned volume. Usually, the procedure takes place 6 to 10 hours, sometimes longer, depending upon the amount ingested [1,6]

Activated charcoal can be used before WBI if needed, but those two interventions are not interchangeable. WBI is its own mechanical method aimed at washing out the intestines.

Evidence-based Evaluation of WBI

Lack of High-Quality Clinical Evidence

A big debate about WBI is the lack of definite proof from randomized controlled trials showing improved mortality or long-term benefits. Most of the existing evidence comes from volunteer studies, case reports, retrospective analyses, and observational cohorts [2,5]. According to the AACT/EAPCCT position paper, WBI shouldn't be used routinely on poisoned patients because there's no strong evidence showing better outcomes [2]. Current

reviews still stress the lack of solid evidence for its widespread use, although they do recognize a specific role for WBI in certain toxicological crises [5,6].

Selective Clinical Applications of WBI

Sustained-Release and Enteric-Coated Drug Overdose

WBI is most commonly used in the ingestion of sustained-release or enteric-coated formulations. These preparations can keep releasing the drug for hours after you ingest them. Activated charcoal doesn't always work well for these kinds of cases, especially if you wait too long [6].

For example,

- Verapamil SR
- Dilitiazem SR
- Bupropion XL
- Theophylline
- Valproate

Volunteer studies show that WBI might reduce drug bioavailability in selected situations; yet, definitive outcome benefits remain uncertain. [2]

Iron and Heavy Metal Poisoning

Activated charcoal is not very good at adsorbing metals like iron or lithium, but that still justifies using WBI. In iron overdose, you can actually see the radioopaque tablets moving around in the gut on X-rays [6]. While most of the evidence comes from case reports and toxicokinetic reasoning, WBI remains suggested for certain severe cases. [2,6]

Lithium toxicity

Lithium poisoning is another case where activated charcoal proves ineffective. Sustained-release lithium can cause prolonged absorption and delay toxicity onset. So, WBI has been used as an extra step, mainly before severe systemic issues arise and haemodialysis is needed. [6]

Body Packers and Body Stuffers

WBI for body packers is still clinically important. The rupture of illicit drug packets could cause catastrophic toxicity and death. Using WBI can help get the packets out quicker mechanically and reduce gastrointestinal transit time. We rely on CT scans to diagnose and monitor. [1]

Adverse Effects and Limitations

WBI is frequently not tolerated very well and comes with great practical challenges.

Common adverse effects are as follows –

1. Nausea
2. Vomiting
3. Abdominal distention
4. Discomfort
5. Aspiration risks [5]

In a retrospective multicenter study, nearly 18% of people who got WBI found it unbearable, experienced vomiting, and experienced a lot of discomfort. Another emergency department study showed that WBI completion rates are pretty low until clear rectal effluent. This just emphasizes how intensive the process is.

Contraindications

1. Bowel obstruction
2. Gastrointestinal perforation
3. Ileus
4. Haemodynamic instability
5. Compromised or unprotected airway [2,6]

Caution is advised in debilitated patients and those at risk of aspiration.

Current Guidelines and Recommendations

Today, contemporary toxicology guidelines advise against using WBI routinely. The AACT and EAPCCT say WBI might be used for certain poisonings, such as sustained-release preparations, enteric-coated drugs, substances that are poorly adsorbed by activated charcoal, and in body packers [2,3].

Recent expert reviews still support this pick-and-choose approach, but point out there's no solid proof it gives better results [5,6].

DISCUSSION

The big question surrounding the whole bowel irrigation (WBI) is whether it really improves patient outcomes, flushing out toxins, not just if it can do this job. In 2015, experts concluded that while WBI might help get rid of certain poisons, there's no strong proof it improves the outcomes of poisoned patients overall. This conclusion remains a key guide for current contemporary practices.

WBI makes more sense in serious cases where the toxin is physically retained or has slow absorption, like with some drug overdoses, iron pills, lithium, or when substances are

smuggled into the body illicitly. For these situations, the pros might outweigh the cons, which include discomfort, it is labour-intensive, and it depends highly on the patient's cooperation. It also takes nursing time; repeated and careful monitoring is needed.

From someone studying this, we think of WBI as a specialised tool in toxicology, not something which should be used routinely. The discussion should highlight that WBI works best when there's a clear benefit and the patient is stable enough to handle the process.

CONCLUSION

WBI has a specific role in contemporary toxicology, even if it's not recommended for regular use based on current evidence. WBI can still help in certain situations, like sustained-release drugs, when activated charcoal fails to adsorb the toxins, and ingested drug packets. But the existing studies have some major drawbacks, so we are still unsure about the benefits yet. Hence, WBI shouldn't be seen as a usual decon procedure. Instead, it's more of a specialized intervention to consider when faced with specific poisoning cases where there's a good physiological reason and no better options available.

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